

Session 64: Histamine and Serotonin impact mosquito population dynamics and malaria transmission: perspectives from mathematical modeling

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Malaria in humans has been shown to influence blood concentrations of certain biogenic amines. Specifically, individuals with severe malaria may exhibit increased concentrations of histamine and decreased concentrations of serotonin. Studies have demonstrated that behavior, physiology, and parasite infection of *Anopheles stephensi* is altered following ingestion of these biogenic amines in bloodmeals, but it remains to be seen what effects these changes may have on mosquito population dynamics and malaria parasite transmission. To address this gap in knowledge, we developed a stage-structured discrete-time mathematical model of mosquito population dynamics coupled with between-host parasite transmission dynamics to investigate how ingested biogenic amine levels might alter the transmission cycle. We incorporated demographic, behavioral, and infection data into the model and explored scenarios with varied concentrations of histamine and serotonin in blood and effects thereof on mosquito population size and malaria incidence and prevalence. We explore different possible extensions of the model and discuss our findings in the context of parasite transmission and future experimental work.

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